

Antoniadi directs attention to some experiments made by him which showed that when single, elliptical, dark spots were examined for a long unbroken period they appeared to develop a duplication similar to that observed in Martian phenomena. He also states that Schiaparelli repeatedly saw the well-defined dark seas with lighter interiors, and when the narrower seas, such as the Mare Cimmerium, Lacus Niliacus, and Sinus Sabaeus were observed steadily for a long time, they manifested a tendency to beget islands which exactly resembled in shape the areas in which they appeared. M. Antoniadi directs attention to the fact that these islands always appeared to be surrounded by "dark canals," and he has therefore arrived at the conclusion that their appearance, and the apparent "gemination" of the canals, are simply results of the physiological effects of "contrast" (*Astronomische Nachrichten*, No. 3016).

OBSERVATIONS OF LEONIDS AND BIELIDS AT ATHENS.—In a communication to the Paris Academy of Sciences, M. Eginitis, director of the Athens Observatory, records the following observations of the Leonid and Bielid showers made at Athens during November:—

Leonids.—November 14, 11h. 50m. to 18h. (Athens M.T.), twelve meteors, appearing to emanate from radiants situated at $\alpha=152^\circ$, $\delta=+25^\circ$, and $\alpha=156^\circ$, $\delta=+20^\circ$, were seen.

November 15, 9h. 50m. to 17h. 50m., 187 meteors were observed from the following radiants:— $\alpha=150^\circ$, $\delta=+22^\circ$; $\alpha=153^\circ$, $\delta=+21^\circ$; $\alpha=152^\circ$, $\delta=+24^\circ$.

November 16, thirty-three meteors observed, chiefly from a radiant situated at $\alpha=150^\circ$, $\delta=+17^\circ$.

This shower appeared to attain its maximum between 15h. and 16h. on November 15. The general colour of the meteors was red, their velocities moderately swift, and their mean brightness equivalent to the fourth magnitude.

Bielids.—A watch was kept for this shower on the evenings of November 22, 23 and 24, but no meteors were seen on November 22, possibly because the sky was very hazy.

From 7h. 46m. to 16h. on November 23, fourteen meteors were seen, chiefly emanating from a radiant situated at $\alpha=23^\circ$, $\delta=+43^\circ$. On November 24 eleven meteors were observed, and these indicated the existence of two radiants, one at $\alpha=26^\circ$, $\delta=+46^\circ$, and the other at $\alpha=26^\circ$, $\delta=+43^\circ$.

In general the Bielids were red in colour and equivalent in brightness to the fifth magnitude stars; they moved so swiftly that their very short paths were hardly visible (*Comptes rendus*, December 7).

THE HIGHER EDUCATION OF WOMEN.

THE adequate provision of secondary and higher education for English girls and women is to be regarded as one of the accomplishments of the latter half of the nineteenth century. In 1850, for instance, the popular idea here and elsewhere was that women were intellectually incapable of benefiting by higher instruction. To quote Dr. Leslie Waggener, of the University of Texas, "it was seriously questioned whether the 'female' mind could untangle the intricacies of pure mathematics, could appreciate the abstruse speculations of metaphysics, or could follow, step by step, the inductions of a scientific investigation." Fifty years' experience has, however, demonstrated the complete fallacy of this preconception. Speaking at the Cambridge University Extension summer meeting in 1900, Mrs. Henry Sidgwick, principal of Newnham College, said of higher education for women, "I do not think its desirability is any longer seriously doubted by anyone who has looked into the facts, and whose opinion on the question is worth considering." Similarly, President Eliot, of Harvard College, in an address in 1896, referring to the university over which he presides, remarked, "it is a quarter of a century since the college doors were opened to women. Since that time, where girls and boys have been educated together, it has become an historical fact that women have made rapid strides, and captured a greater number of honours in proportion to their number than men."

To complete a change of opinion on a subject of such importance as the suitable education of the larger half of the human race deserves attention, and the steps in the

movement which has resulted in the recognition of the claims of women at most universities throughout the world, supply a profitable study for all students of educational problems. A comparison, too, of the present provision of university courses for women with their complete non-existence in 1850 should serve to cheer those men of science and others who are endeavouring to improve our national education in other directions. It is gratifying, in beginning a brief historical summary of the growth of the movement to provide secondary and higher education for women, to be able to state that among the first efforts in this direction were those made in England. The absence of public secondary schools for girls in this country, and the impossibility of obtaining really educated governesses, were the causes which led the late F. D. Maurice and others to work with the Governesses' Benevolent Institution to improve matters, and the labours of these pioneers led to the establishment, in 1848, of Queen's College, London, the original object of which institution was to train women teachers. In the following year Bedford College, London, was founded, and so successful has it been that it is now one of two colleges for women which are constituent colleges of the reconstructed University of London. A good start having been made, the movement grew and ere long flourished greatly in several localities. The North London Collegiate School for Girls was established by Miss Frances Buss in 1850, and the Ladies' College at Cheltenham in 1853. The thorough education of the daughters of middle-class families had become sufficiently general in 1863 to convince the University of Cambridge of the advisability of at least trying the experiment of admitting girls to the local examinations conducted by them in various centres throughout the country, and in 1865 girls were formally admitted. Then came the Schools Inquiry Commission of 1864, which, after sitting for three years, reported at the end of 1867. Ladies were called upon by the Commission to give evidence as to the provision for the secondary education of girls, and, to quote Mrs. Henry Sidgwick again, "The assistant commissioners, who had examined and reported on the condition of secondary education in various districts, gave a deplorable account of the insufficiency of the girls' schools, and of the immense difficulty of finding any adequately-educated female teachers for them." In 1872, the National Union, under the presidency of Princess Louise, was started to reform girls' education. This association soon established the Girls' Public Day Schools Company, and at present, this company alone, has 34 schools, about 7000 pupils, and about 600 teachers of different grades.

This cursory glance at the history of the attempts made to supply English girls with secondary education is necessary, because the need created by the establishment of these schools for highly qualified women teachers directed attention to the necessity for the provision of higher education at English colleges and universities, a need which had hitherto been completely ignored. The recognition of the claims of women to as much education as they desire has in England been brought about gradually, and it will be convenient to indicate the more important steps taken since the foundation of Queen's College, London, in 1848, and then to outline, as exactly as possible, the present state of things in other countries. It will simplify matters, too, to deal with different countries separately, and to take the universities of Great Britain and Ireland first, and in most detail.

GREAT BRITAIN AND IRELAND.

Special lectures for women were started in connection with the University of Cambridge in 1870. Girton College was incorporated at Cambridge in 1873, though it had been in existence at Hitchin since 1869, and from its inauguration had prepared its students for the examinations of Cambridge, where women were first informally examined for the previous examination in 1870, and for the tripos examination in 1872. Girton was "designed to hold in relation to girls' schools and home training a position analogous to that occupied by the universities towards the public schools for boys." In 1871, a house of residence for women attending university lectures was opened in Cambridge, and this institution became known, in 1875, as Newnham Hall, and was constituted a college in 1880. In the same year as Newnham College was incorporated, the uni-

versity appointed a syndicate to consider the question of conferring degrees on women, with the result that in 1881, though degrees were refused, formal admission for women to the previous and tripos examinations was granted. And up to the present time the privilege of receiving degrees is withheld, though women are admitted by courtesy to almost all lectures. A syndicate appointed in 1896 recommended that degrees be conferred by diploma without permitting admission to membership of the university, but the proposal was rejected by the Senate in 1897 by 1713 votes to 662. The concession of 1881 still regulates the admission of women to the examinations of the university. In order to be permitted to take the tripos examinations women must reside at Girton or Newnham, and admission to these colleges is only granted to students who have passed the previous or some other recognised examination. A class list of female students is published after the examinations, along with the list of members of the university; the method of arrangement is the same in both cases, and certificates are given to women stating the class or place in class attained in each examination.

At Oxford, lectures and classes were started for women in 1873, and examinations were instituted for them two years later. An association for encouraging the education of women was formed in 1878, and is still in active existence. Through the secretary of the association women are admitted to nearly all the lectures given in Oxford, and the council of the association registers all women students. These students are either in residence at Somerville College (founded 1879), Lady Margaret Hall (1879), St. Hugh's Hall (1886), St. Hilda's Hall (1893), or belong to the Society of Home Students, comprising students who reside in private families and are supervised by the council of the association. In 1884, honour moderations and final honour schools of mathematics, natural science, and modern history were opened to women, and from time to time admission to the examinations of other schools was granted, but it was not until 1894 that they were free to present themselves for examination in all the subjects in which men may take the B.A. degree. Women are not eligible for degrees. Congregation rejected a proposal, in 1896, to admit women to degrees or to grant them diplomas recording their success in the final schools examinations. An important difference between Oxford and Cambridge is that at the former, university women are admitted to the pass as well as to the honour schools, and for either examination; an outside student is equally eligible with those who have studied and resided at Oxford.

As regards the extent to which women avail themselves of the facilities offered by the Universities of Cambridge and Oxford for their higher education, it may be said that, during the session 1901-2, Girton and Newnham together had 292 students, while in 1902 there were at Oxford 228 registered women students. The whole number of women students who took honours in the various triposes at Cambridge from 1881, the year in which they were opened to women, to 1900 was 1036, and of these 180 took honours in natural science, the numbers in mathematics being 250 and in classics 227.

The University of London, which received its first charter in 1836, was the first English university to recognise the claims of women. In 1867 the university was granted a supplementary charter, under which it was enabled to offer certain special certificates to women. In 1880 women were admitted to all the degrees, honours, and prizes which were at the disposal of the university, and in 1882 women graduates were admitted as members of convocation.

The University of Durham, by a supplementary charter granted in 1895, opened all its degrees except those in theology to women. Women are admitted to university lectures on the same conditions as men, but to qualify for the degrees women must reside at Durham in the women's hostel provided by the university.

The University of Wales, which came into existence under the charter of 1893, admits women to its examinations and degrees, as members of the university, on the strictest equality with men, and women are equally eligible for any office created by the university. Much the same is true of the recently constituted universities, such as those of Birmingham and Liverpool, and at the university colleges

throughout the country no distinction is made between the sexes.

So far as the Scottish universities are concerned, that is to say, the Universities of Aberdeen, Edinburgh, Glasgow, and St. Andrews, it is only necessary to say that the Universities (Scotland) Act, 1889, included a provision "to enable each university to admit women to graduation in one or more faculties, and to provide for their instruction." An ordinance to this effect was passed in 1892, with the result that women are in every case admitted to the degrees in arts, science and medicine, and at Aberdeen to the degrees in law. The university lectures are, as a rule, open to women, but in some cases separate instruction is provided for them.

Despite current rumours, there are at present in Ireland but two universities, Dublin University, or Trinity College, Dublin, and the Royal University. The admission of women has been approved by the council of Trinity College, and a recommendation was brought before the Senate on June 9 of this year and sanctioned by an overwhelming majority. In the case of the Royal University of Ireland, which, like the old University of London was, is purely an examining body, all degrees, honours, scholarships, and even junior fellowships are open to students of either sex, and candidates for medical degrees alone are required to pursue fixed courses of study at special colleges.

Before reviewing the regulations for the admission of women to continental universities, a digression, interesting at least to men of science, may be permitted. What is the character of the education given in schools for girls by the women who have had the advantages resulting from the concessions now described? What part does science take in the curricula of the schools administered by university women? It may at least be said that it is becoming increasingly understood that household management is a branch of applied science; cookery and laundry work, ~~work~~, ^{are} ~~any~~ ^{now} in some quarters at least, recognised as applications of chemistry to domestic needs; and hygiene and physiology are appreciated to some extent as the foundations upon which the arrangements for the health of the home should be based. But the adherence to these commonplace truths is still too much a matter of theory, and the present methods of teaching in girls' schools are based almost exclusively upon what has grown up in the schools for boys. Prof. Armstrong, at this year's meeting of the British Association, offered a strong protest in this connection. He said, "When I consider what my own children have done at school, what girls generally are doing, I am in despair—the training is so hopelessly unpractical, so academic, so narrow in its outlook. There is so little insight and originality displayed by women in diagnosing and providing for women's requirements; female educators are so obstinate and difficult to persuade, so limited in their conceptions." More recently that vigorous and brilliant author, Mrs. F. A. Steel, has written: "Read through, for instance, the Education Act—new or old does not matter, since any Education Act I have ever heard of errs with equal and intolerable ignorance—and see if the one great unalterable difference in physiological life between a boy and a girl is even considered. It is not. And yet it is, it must be perchance, a potent factor in the whole question of girls' education."

The fact is that as yet we have not had sufficient experience in the direction of girls' education to come definitely to final conclusions. Speaking comparatively, it is a new movement, and such warnings as those just quoted, useful though they are as hints that caution and a reconsideration of the special needs of girls are necessary, should not lead to violent changes which are likely to do more harm than good. Though many questions raised are as yet insoluble, one thing at least seems tolerably clear, and that is the desirability of the introduction into all schools for girls of instruction in the scientific method. The inculcation of habits of exact observation, of accurate measurement, and of the absolute necessity for deriving all conclusions from sufficient premises, habits which are most easily and satisfactorily formed by the study of suitable branches of science, will act as the most effective corrective to the feminine disposition to arrive at conclusions intuitively, and to assert that a thing is so because it is so.

It may be pointed out here that there seems, judging

from the statistics of popular examinations, a disposition, in selecting the branch of science which shall form the foundation of the scientific instruction in girls' schools, to be guided rather by æsthetic than by educational considerations. To take one instance, in the local examinations of the University of Cambridge in 1902, while in the preliminary grade 1776 boys presented themselves in various branches of physics and chemistry, there were only 175 girls offering these subjects; on the contrary, 481 girls offered botany as compared with 65 boys. The same thing was true in the junior and senior grades; in the former about 5000 boys took up various subjects of physics and chemistry as compared with 300 girls, and in the latter the numbers were:—boys, more than 1300, girls, just over 100; in botany, on the contrary, the number of junior girls was 754, junior boys 29, of senior girls 261, senior boys 14. It is not suggested that it is impossible to inculcate scientific methods by means of the study of botany, for Prof. Miall has shown the contrary quite conclusively, but a knowledge of current text-books and methods leads to the belief that, nowadays at least, the above contention is a just one.

The urgent need at present, and one which might well engage the earnest attention of men of science, is to formulate a scheme of scientific instruction for girls' schools which, while inculcating the fundamental principles of physics and chemistry, shall lead to an intelligent application of these principles to the practical requirements of the household, whether in the kitchen, in the nursery, or in the general sanitary arrangements. Though such a course might well form the basis of the science teaching, there is no reason why an intelligent acquaintance with animate nature should not also be made. Nor need the special requirements of those girls who will later, instead of devoting their energies to home-life elect to take up scientific or medical work, be neglected. Since, as the imposing list of women engaged in scientific work given in the "English-woman's Year-Book," and the growing number of women doctors (177 were registered in the British Medical Register in 1894) show, there is an increasing attraction for women in the study of science, due provision for specialisation in science should be made in those secondary schools where girls remain until nineteen.

THE CONTINENT OF EUROPE.

In dealing with the provisions made for the university education of women in the different European countries, it is a little difficult to present inclusive generalisations. The local conditions vary so widely, and the national peculiarities are so various, that the most satisfactory plan is to deal separately with those countries in connection with which materials are available. Moreover, it is difficult within the limits of a single article, to attempt to summarise the history of the attempts made to improve matters so far as the higher education of women is concerned, and in the main it will be necessary to limit attention to the present state of affairs.

In Austria, to take the countries in alphabetical order, a decree of 1897, revising one made by the Minister of Education in 1878 regulating the admission of women to the universities of that country, ordained that any woman more than eighteen years of age who is a native of Austria may be admitted as a hearer to the philosophical faculty of an Austrian university, provided she has passed the *Reifeprüfung* or equivalent examination. The order for the admission of individual women is in the hands of the dean of the faculty, but an appeal may be made from his decision to the Minister of Education. Women hearers are under the same regulations as men. In 1896, Austrian women who had studied medicine at a foreign university were placed on the same footing as their countrymen in obtaining Austrian degrees in medicine. It is interesting to note in this connection that the first Austrian woman who obtained the degree of doctor of medicine did so at Vienna in 1897.

Women have been admitted to the universities of Belgium on the same conditions as men since 1893, though it must be stated that the Free University of Louvain is an exception, and does not admit women. Since 1890 an increasing number of Belgian women have availed themselves of the opportunity of university education.

To the Danish universities women have been admitted

under the same conditions as men since 1875, and may take examinations and degrees in all faculties except that of theology, in which there is a special examination for women.

In Finland, women who wish to enter the University of Helsingfors, the only university in the country, must obtain the special permission of the chancellor of the university. Notwithstanding this impediment, there were in 1900 more than 200 women studying in the university.

All the courses in all the faculties and schools of the French universities with the exception of the *cours fermés* and the practical work are public, and open free of charge to persons of either sex as hearers. Matriculated students alone may attend practical work and the *cours fermés*; and to matriculate both men and women candidates must present a *diplôme de l'enseignement secondaire*. Women may become candidates for degrees on the same conditions as men. *Attestations d'études supérieures* are given by some faculties to hearers who have attended the courses regularly. In the provincial universities no requirement is made as to sex, but in Paris the hearer, to obtain the certificate, must have taken a bachelor's or an equivalent degree. It must be noted that not quite all the medical courses are open to women. The number of women students registered in French universities at the beginning of 1898 was 871, of whom 469 were studying medicine and 80 different branches of science. In the previous session 72 university degrees were obtained by women, but only one was in the science faculty, though 15 others were successful licentiates in science.

The universities of Germany do not treat women in a uniform manner. The conditions under which women study vary in different centres. As a rule, women are admitted only as hearers to the lectures of the philosophical faculty, though some German universities have permitted attendance in the legal and medical faculties. In the winter session of 1898-9, 414 women were in attendance at the ten Prussian universities as against 117 in 1895-6. At Berlin, Freiburg, Göttingen, Heidelberg, and Tübingen, women have been granted the degree of doctor of philosophy (Ph.D.). Even when women are admitted to the philosophical faculty of the universities they are mostly there on sufferance; they have no rights, and do not count as students. As Dr. Isabel Maddison has said, "the whole question of the admission of women to the universities has given rise to much discussion in Germany, and is still far from being settled. Many Germans regard the higher education of women as undesirable, and there is a strong objection manifested by a large number of the professors and students alike to the admission of women to the universities . . . the seriousness of purpose and the ability of individual women who have studied in Germany have, it is believed, done much towards destroying the prejudice against women students in the minds of the professors under whom they have worked."

In Greece, the National University in Athens was opened to women in 1895. The other institutions in the country of university standing, such as the English School of Archaeology, admit women to their lectures. In 1895, too, the philosophical and medical departments of the universities of Hungary were opened to women by the Minister of Education, but to enter the universities they have to fulfil exactly the same conditions as men.

In Italy, in the Netherlands, and in Norway, women may enter the universities on a footing of equality with men. In Italy two classes of women students are admitted, viz. regular students and hearers. In the Netherlands no distinction is made between men and women; the latter are allowed to matriculate and to take degrees. Since 1884 women have been admitted to the lectures and degrees of the University of Christiania, and where there is no special regulation which prevents them, women may also compete for the scholarships and prizes.

All Russian universities exclude women. Special classes are held at St. Petersburg for the higher instruction of women under the supervision of the Minister of Public Instruction.

Speaking generally, the universities of Spain, Sweden, and Switzerland are open to women students. The Spanish universities have been open in a general way to women since 1857, when the universities of the country were placed under the control of the General Director of Public Education, but

Spanish women have made little use of the facilities offered. In Sweden, women appear to be excluded from the theological faculties, but since a Royal decree of 1870 they have been able to take medical degrees, and from 1873 the legal and philosophical faculties have been open to them. The seven universities of Switzerland are, without exception, open to women; the conditions under which they study vary somewhat in different universities.

AMERICA.

All courses and degrees of Canadian universities are, as a rule, open to women on the same terms as men, though in some cases they study for medical degrees in separate medical schools. The colleges of the various universities do not generally possess boarding accommodation for the students, who reside in boarding houses approved by the college authorities.

It is impossible at the end of a general article to do more than give one or two salient facts in reference to the higher education of the women of the United States. The report for 1899 of the Commissioner of Education states: "The barriers to women's higher education seem effectually removed, and to-day eight-tenths of the colleges, universities, and professional schools of the United States are open to women. . . . The obtaining of a collegiate education gives the women more ambition to enter a profession, or if they decide to marry, it is stated that—'The advanced education they have received has added to their natural endowments, wisdom, strength, patience, balance, and self-control . . . and that in addition to a wise discharge of their domestic duties, their homes have become centres of scientific or literary study or of philanthropy in the communities in which they live.'

The number of women undergraduate and resident graduate students in the colleges of university standing in the United States in the year 1900-1 was very nearly 47,000, and of these about 21,500 studied in colleges side by side with men. During this year 5050 degrees were conferred on women, nearly half as many as were gained by men, viz. 11,463.

Such are, in the barest outline, the leading facts as to the attitude of the more important countries towards the higher education of their women. The reader who desires more detailed knowledge should refer to the following sources of information, upon which the writer has largely based his conclusions:—"Handbook of British, Continental and Canadian Universities, with Special Mention of the Courses Open to Women," "Supplement to ditto, for 1897," by Dr. Isabel Maddison (New York: The Macmillan Co.). "Educational Systems of Great Britain and Ireland," by Graham Balfour (Oxford: Clarendon Press). "Education in the Nineteenth Century," edited by Dr. R. D. Roberts (Cambridge: University Press). "Growth of Educational Ideals during the 19th Century," by Sara A. Burstall (*The School World*, 1902). "Englishwoman's Year-Book, 1903" (Black). "Annual Reports of the Department of the Interior," by the Commissioner of Education (Washington: Government Printing Office).

A. T. SIMMONS.

CAVE EXPLORATION IN IRELAND.¹

HERE is little doubt that the visit, a few years back, of the enthusiastic M. Martel, whose "Irlande et Cavernes anglaises" forms such pleasant reading, did much to rouse new interest in Irish caves. Dr. Forsyth Major soon after examined the Irish fossil Mammalia in the Dublin Museum of Science and Art, where Dr. Scharff was at the same time summarising his researches on the origins of the European fauna; on this question the pre-Glacial and post-Glacial Pleistocene remains naturally throw a considerable light. Mr. R. J. Ussher, already distinguished by his published work on southern caves, was fortunately again willing to devote his time to exploration. Circumstances were thus favourable to the formation of a committee,

¹ "The Exploration of the Caves of Kesh, County Sligo, being the First Report of the Committee, consisting of Dr. R. F. Scharff (chairman), George Coffey, Prof. Grenville A. J. Cole, R. J. Ussher, and R. Lloyd Praeger (secretary), appointed to Explore Irish Caves" (*Trans. Royal Irish Academy*, vol. xxxii. sect. B, part iv.). Pp. 46 and 3 plates. (Dublin, 1903). Price 2s.

which, aided by grants from the Royal Irish Academy and the British Association, has examined certain caves near Ballymote, in the county of Sligo, and is actively engaged on others near Edenvale, in Clare.

The present report is a well edited quarto paper, with several illustrations. Mr. George Coffey, keeper of the collection of Irish antiquities in the Dublin Museum, deals with the traces of human occupation, and, like most of the contributors, has personal knowledge of the caves. The geological section is greatly strengthened by the visit of Mr. G. W. Lamplugh to Keshcorran, and his association as joint-author in the report. Messrs. A. S. Kennard and B. B. Woodward describe the Mollusca, and are known as specialists in this comparatively unworked branch. Mr. E. T. Newton, F.R.S., has identified the remains of birds, while Prof. D. J. Cunningham, F.R.S., describes the scanty human bones. In work where wide deductions may be founded on a single fragmentary relic, this specialisation among the contributors cannot be too highly praised.

Mr. Ussher's general description provides an interesting introduction to the detailed essays. Messrs. Cole and Lamplugh then show that the caves depend for their form on the joint-planes in the massive limestone, and that they were excavated by solution in pre-Glacial times. Glacial detritus then became banked against the slope, and crept into the caves from their mouths. As the ice melted, characteristic mounds of similar material were deposited in the lowland below Keshcorran.

A good part of the deposit within the caves is derived from the solution of the limestone, and includes characteristic bipyramidal crystals of quartz. A spicular crystalline material, mingled with the calcareous tufa, affecting polarised light, and soluble in acids, has unfortunately so far eluded determination. The possibility of the discovery of pre-Glacial remains in such caves in Ireland is pointed out.

As Mr. Ussher indicates, in commenting on Mr. Newton's list of the bones of birds from the caves, the smew, the grey plover, and the little auk are now rare inland, even in winter; the discovery of their remains has therefore some bearing on the climate during their occupation of Keshcorran. Dr. Scharff, in his account of the mammals, identifies the Arctic lemming, not previously known in Ireland. The remains of horse, obtained, with one exception, from the upper stratum of the principal cave that was examined, show that "horse-flesh probably formed one of the principal articles of diet of the cave-men." The traces of the mountain or Irish hare, the true *Lepus timidus* of Linné, indicate a larger animal than that now prevalent in Ireland. Bear (*Ursus arctos*) is represented by a fine left ramus of a lower jaw and very numerous remains. The distribution of the bones of all these animals is easily realised from the small maps provided, on which those found in the upper stratum are indicated separately from those in the lower.

Mr. George Coffey considers that man's occupation of the caves does not date back to a very remote period. Charcoal is frequent in the upper layers, and its distribution, together with the objects found, suggests a brief occupation of the caves in Neolithic times, and a more prolonged settlement when bronze and iron were both common. This latter occupation seems to have been as recent as the eighth to the eleventh century of our era, and Mr. Coffey ingeniously pictures the bear as responsible for the general avoidance of the locality in earlier times.

Mr. R. Lloyd Praeger, now editor to the Royal Irish Academy, summarises the results, and his detailed plan and the illustrative plates are worthy of the body which has undertaken their publication.

G. A. J. C.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

PROF. A. G. BOURNE, F.R.S., professor of biology at the Presidency College, is to take up the duties of Director of Public Instruction, Madras.

MR. H. J. MACKINDER, lecturer in economic geography at the London School of Economics, has been appointed director of the School in succession to Prof. W. A. S. Hewins, who has resigned the post.